THE PROCEEDINGS OF THE PHYSICAL SOCIETY

FROM JANUARY 1948 TO JUNE 1948

VOLUME 60

Published by
THE PHYSICAL SOCIETY
1 Lowther Gardens, Prince Consort Road,
London S.W. 7

Printed by
TAYLOR AND FRANCIS, LTD.,
Red Lion Court, Fleet Street, London E.C. 4

CONTENTS

Part 1. 1 *January* 1948

PAGE

D. C. Pack, (Dr.) W. M. Evans and H. J. James. The propagation of shock waves in steel and lead 1
Robert Weil. The variation with temperature of metallic reflectivity . . . 8
D. A. Wright. Work function and energy levels in insulators 13
D. A. Wright. Energy levels in oxide cathode coatings 22
(Dr.) N. R. Campbell and (Dr.) L. Hartshorn. The experimental basis of electromagnetism : Part II—Electrostatics 27
A. W. Brewer, (Dr.) B. Cwilong and (Dr.) G. M. B. Dobson. Measurement of absolute humidity in extremely dry air 52
C. H. Collie, J. B. Hasted and D. M. Ritson. The cavity resonator method of measuring the dielectric constants of polar liquids in the centimetre band . 71
(Dr.) B. Bleaney and R. P. Penrose. Pressure broadening of the inversion spectrum of ammonia : Part II—Disturbance of thermal equilibrium at low pressures . 83
(Miss) Dorothy G. Fisher. The molecular structure and arrangement in stretched natural rubber 99
Reviews of books 114

Part 2. 1 *February* 1948

(Dr.) H. Wilman. The structure of photo-sensitive lead sulphide and lead selenide deposits and the effect of sensitization by oxygen 117
(Dr.) W. A. Prowse. Solid diagrams illustrating resonance phenomena . . 132
(Dr.) L. R. G. Treloar. Stresses and birefringence in rubber subjected to general homogeneous strain 135
C. H. Collie, J. B. Hasted and D. M. Ritson. The dielectric properties of water and heavy water 145
(Dr.) Kun Huang. Quantum mechanical calculation of the heat of solution and residual resistance of gold in silver 161
(Dr. W. E. Duncanson and (Prof.) C. A. Coulson. Electron momenta in atoms . 175
(Dr.) Mohammed Chaudhri and A. G. Fenton. Some experiments with adjustable Geiger-Müller counters 183
N. F. Astbury. The calibration of hydrophones and crystal transceivers . . 193
N. Corcoran and J. M. Hough. A method of computing a vertical section of the combined polar diagram of a radio aerial, a flat earth and a vertical screen . . 203
Letters to the Editor :
(Dr.) F. C. Frank. An isotopic abundance rule and its bearing on the origin of the nuclei 211
Reviews of books 212
Instructions to Authors . . . . . insertion

Part 3. 1 *March* 1948

(Prof.) L. F. Bates and E. G. Harrison. The adiabatic temperature changes accompanying the magnetization of some ferromagnetic alloys in low and moderate fields 213

PAGE

(Prof.) L. F. Bates and E. G. Harrison. The adiabatic temperature changes accompanying magnetization in low and moderate fields : A further study of iron 225
R. Street. The variation with magnetization of Young's modulus for cobalt . 236
K. W. Plessner. The electric strength of dielectric films 243
(Prof.) C. A. Coulson. Excited electronic levels in conjugated molecules : I. Long wavelength ultra-violet absorption of naphthalene, anthracene and homologs . 257
(Dr.) H. C. Longuet-Higgins. Excited electronic levels in conjugated molecules : II. On the symmetry and multiplicity of molecular states 270
J. B. Birks. The measurement of the permeability of low-conductivity ferromagnetic materials at centimetre wavelengths 282
T. Smith. On perfect optical instruments 293
(Prof.) E. N. da C. Andrade. A new device for maintaining constant stress in a rod undergoing plastic extension 304
Letters to the Editor :
(Prof.) L. F. Bates and J. H. Davis. The effect of temperature on the heat changes accompanying magnetization of the nickel-silicon alloy W.5 . . 307
Corrigenda 308
Reviews of books 308

Part 4. 1 *April* 1948

W. E. Moffitt and (Prof.) C. A. Coulson. The electronic structure and bond lengths of coronene and pyrene 309
(Miss) C. C. Dilworth. The influence of surface films on the electrical behaviour of contacts 315
B. Donovan. The specific heat of a linear ionic lattice 325
(Dr.) H. Wilman. The interpretation and application of electron-diffraction ' Kikuchi-line ' patterns—Part I. The determination of the crystal unit cell, its orientation and the crystal symmetry 341
(Dr.) E. P. Wohlfarth. Thermionic emission constants and band overlap . . 360
(Dr.) H. D. Bush and (Dr.) R. S. Tebble. The Barkhausen effect . . . 370
R. E. Belin. A radiosonde method for atmospheric potential gradient measurements 381
(Miss) Marjorie Williamson. A note on the Lecher wire method of measuring impedance 388
(Prof.) N. F. Mott. Slip at grain boundaries and grain growth in metals . . 391
Letters to the Editor :
(Dr.) B. Bleaney and (Dr.) R. P. Penrose. Paramagnetic resonance at low temperatures in chromic alum 395
J. B. Hasted. Milli-microsecond pulse generation by electron bunching . . 397
Reviews of books 398

Part 5. 1 *May* 1948

(Dr.) G. L. Pickard and (Prof.) F. E. Simon. A quantitative study of the expansion method for liquefying helium 405
(Dr.) M. Désirant and (Dr.) D. Shoenberg. Penetration of magnetic field into superconductors : I. Measurements on thin cylinders 413
(Dr.) K. D. Froome. The rate of growth of current and the behaviour of the cathode spot in transient arc discharges 424

PAGE

(Dr.) S. P. Sinha. Blue and ultra-violet bands of K_2 436
(Dr.) S. P. Sinha. Ultra-violet bands of Li_2 443
(Dr.) S. P. Sinha. Ultra-violet bands of NaK 447
R. M. Sillitto. An extension of Kapitza's theory of δ-radiation . . . 453
G. K. Horton. Angular distribution in internal pair creation 457
(Dr.) E. Broda, (Dr.) W. E. Grummitt, J. Guéron, L. Kowarski and (Dr.) G. Wilkinson. The correction for self-weakening in β-ray measurements . . 460
D. G. E. Martin, (Dr.) H. O. W. Richardson and Yun-Kuei Hsü. The β-ray spectrum of ThC″D 466
(Prof.) B. Ferretti and (Dr.) M. Krook. On the solution of scattering and related problems 481
(Dr.) A. C. B. Lovell and J. A. Clegg. Characteristics of radio echoes from meteor trails : I. The intensity of the radio reflections and electron density in the trails . 491
Letters to the Editor :
(Dr.) A. C. Menzies and J. Skinner. Polarization of second order Raman effect in alkali halides 498
Reviews of books 499

Part 6. 1 *June* 1948

(Miss) B. Zając, (Dr.) E. Broda and (Prof.) N. Feather. A further study of the γ-radiation from polonium 501
(Mrs.) Phyllis Nicolson and (Dr.) V. Sarabhai. The semi-diurnal variation in cosmic ray intensity 509
W. M. Gibson and D. L. Livesey. The neutrons emitted in the disintegration of nitrogen by deuterons 523
L. Gerö and R. Schmid. Dissociation energy of the NO molecule . . . 533
(Dr.) B. Bleaney and (Dr.) R. P. Penrose. Collision broadening of the inversion spectrum of ammonia : III. The collision cross-sections for self-broadening and for mixtures with non-polar gases 540
(Dr.) M. Blackman and (Dr.) J. L. Michiels. Efficiency of counting systems . 549
(Prof.) L. B. Loeb: Certain aspects of the mechanism of spark discharge . . 561
(Dr.) G. F. J. Garlick and A. F. Gibson. The electron trap mechanism of luminescence in sulphide and silicate phosphors 574
N. F. Astbury. The moving coil galvanometer as a circuit element . . . 590
Letters to the Editor :
W. Moffitt. The structure of carbon monoxide 597
N. Davy. A note on the shape of the polepieces of a synchrotron magnet . 598
Reviews of books 599
Index to Volume **60** 601
Index to Reviews of books, Volume 60 606